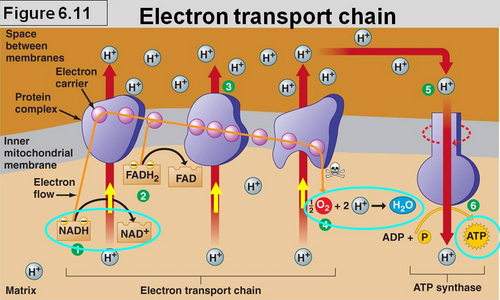
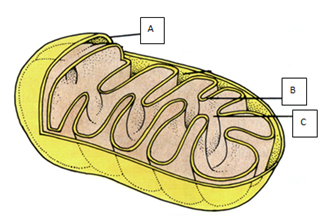
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**Unit 4 Review Packet: Cell Energy**

Ms. Ottolini, PreAP Biology

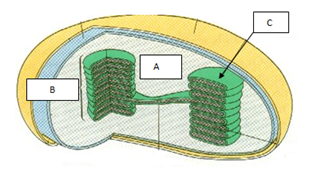
1. Describe the structure of ATP (adenosine triphosphate). Why do living organisms use ATP as the main energy storage molecule in the cell?
2. What is the difference between a heterotroph and an autotroph?
3. Identify and describe the two types of autotrophs.
4. Why are photosynthesis and respiration often thought of as a cycle?
5. In what cell parts (i.e. organelles) of eukaryotic cells do photosynthesis and cellular respiration take place?
6. What is the equation for cellular respiration? (In words and chemical formulas!)
7. What is the main goal of cellular respiration?
8. What are the three steps of cellular respiration, what is the goal of each step, and where does each step occur within the cell or mitochondrion?

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| **Step Name** | **Goal** | **Location** |
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1. In what step of cellular respiration is the most ATP created?
2. Explain (step-by-step) the process that is occurring in the image to the right. *(Hint: this is an image of the electron transport chain in cellular respiration.)*
3. Explain how the following sequence represents the energy changes that occur during cellular respiration: Food 🡪 glucose 🡪 NADH 🡪 ATP.
4. Compare / contrast aerobic and anaerobic respiration (aka fermentation). Which type of respiration makes more ATP?
5. Explain the difference between the two types of anaerobic respiration and identify the organisms that use these types of anaerobic respiration.
6. Identify the parts labeled on the mitochondrion pictured to the right.
7. What is the equation for photosynthesis? (In words and chemical formulas!)
8. What is the main goal of photosynthesis?
9. What are the two steps of photosynthesis, what is the goal of each step, and where does each step occur within the chloroplast?

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| **Step Name** | **Goal** | **Location** |
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1. Describe how chlorophyll is used during the light reactions of photosynthesis.
2. Describe how water is used during the light reactions of photosynthesis.
3. How / when is oxygen gas produced during photosynthesis?
4. How / when is carbon dioxide gas used during photosynthesis?
5. How is NADPH created during the light reactions and used during the dark reactions of photosynthesis?
6. How could you measure the rate (amount over time) of photosynthesis in a plant? *(Hint: There are several correct answers to this question!)*



1. Identify the parts labeled on the chloroplast pictured to the right.
2. How did mitochondria and chloroplasts become part of eukaryotic cells through endosymbiosis? Provide two pieces of evidence to support the idea that mitochondria and chloroplasts were once free-living organisms.
3. How do plants take in water and transport water throughout their bodies? Why is water important in photosynthesis?
4. How do plants take in carbon dioxide and release oxygen?
5. Identify several factors that might INCREASE the rate of photosynthesis in plants.